

TABLE 5.—Maximum free-air wind velocities (M. P. S.), for different sections of the United States based on pilot-balloon observations during May 1937

| Section | Surface to 2,500 meters (m. s. l.) | | | | | Between 2,500 and 5,000 meters (m. s. l.) | | | | | Above 5,000 meters (m. s. l.) | | | | |
|----------------------------|------------------------------------|-----------|-----------------------|------|---------------|---|-----------|-----------------------|------|-------------|-------------------------------|-----------|-----------------------|------|---------------|
| | Maximum velocity | Direction | Altitude (m) M. S. L. | Date | Station | Maximum velocity | Direction | Altitude (m) M. S. L. | Date | Station | Maximum velocity | Direction | Altitude (m) M. S. L. | Date | Station |
| Northeast ¹ | 31.5 | SW | 1,048 | 13 | Cleveland | 37.0 | WNW | 4,410 | 17 | Columbus | 44.8 | WNW | 6,095 | 18 | Cleveland. |
| East-Central ² | 26.2 | W | 1,860 | 16 | Cincinnati | 31.6 | W | 3,160 | 17 | Washington | 44.0 | W | 11,520 | 1 | Greensboro. |
| Southeast ³ | 25.5 | E | 660 | 1 | Tampa | 24.5 | WSW | 2,680 | 5 | Spartanburg | 34.1 | W | 11,280 | 4 | Charleston. |
| North-Central ⁴ | 30.2 | NW | 1,332 | 12 | Bismark | 30.8 | NW | 3,890 | 15 | Detroit | 40.0 | NW | 10,570 | 14 | St. Paul. |
| Central ⁵ | 30.2 | SSW | 2,460 | 11 | Davenport | 29.0 | NW | 4,240 | 17 | Chicago | 35.5 | NNW | 7,360 | 14 | Wichita. |
| South-Central ⁶ | 28.8 | SE | 1,010 | 19 | Oklahoma City | 33.6 | SW | 3,550 | 20 | Amarillo | 41.2 | SW | 12,690 | 31 | Abilene. |
| Northwest ⁷ | 25.8 | SE | 2,440 | 2 | Seattle | 51.2 | WSW | 4,250 | 28 | Medford | 39.9 | WSW | 9,294 | 14 | Portland. |
| West-Central ⁸ | 35.7 | SSW | 2,470 | 18 | Modena | 39.6 | SW | 3,735 | 14 | Modena | 39.6 | W | 7,610 | 15 | Rock Springs. |
| Southwest ⁹ | 33.4 | WSW | 1,902 | 15 | Winslow | 40.0 | SSW | 4,638 | 25 | Winslow | 36.6 | S | 6,684 | 28 | Albuquerque. |

¹ Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and northern Ohio.

² Delaware, Maryland, Virginia, West Virginia, Southern Ohio, Kentucky, Eastern Tennessee, and North Carolina.

³ South Carolina, Georgia, Florida, and Alabama.

⁴ Michigan, Wisconsin, Minnesota, North Dakota, and South Dakota.

⁵ Indiana, Illinois, Iowa, Nebraska, Kansas, and Missouri.

⁶ Mississippi, Arkansas, Louisiana, Oklahoma, Texas (except El Paso), and western Tennessee.

⁷ Montana, Idaho, Washington, and Oregon.

⁸ Wyoming, Colorado, Utah, northern Nevada, and northern California.

⁹ Southern California, southern Nevada, Arizona, New Mexico, and extreme west Texas.

RIVERS AND FLOODS

[River and Flood Division, MERRILL BERNARD in charge]

By BENNETT SWENSON

The following report of flood losses for the Ohio River and tributaries at and above Wheeling, W. Va., during the flood of April 26, was received too late for inclusion in the April REVIEW and is presented herewith: Allegheny River, \$352,000; Monongahela River, \$788,000; and the Ohio River at and above Wheeling, W. Va., \$533,300. Reported savings as a result of flood warnings for this section amounted to about \$1,500,000.

Atlantic Slope and East Gulf Drainage.—Most of the streams in this area from North Carolina southward reached flood stage late in April or the first part of May as a result of rains during the latter part of April. Additional rains occurred during the first week of May, particularly over portions of the East Gulf States, and increased the stages considerably in the Tombigbee River. No losses of consequence occurred as a result of these floods, except as follows: Altamaha River, \$33,750; Apalachicola River, \$5,500; and Tombigbee River, \$171,000.

Frequent rains in the New England States during most of the month, with unusually heavy rains occurring on the 14th and 15th, resulted in a moderate flood in the Connecticut River. Reports of losses have not been received.

Upper Mississippi Valley.—The flood in the Illinois River began about April 21 and continued through the third week in May. The flood was light, and the only loss of consequence was to prospective crops, with a total loss amounting to \$25,000.

A small flood occurred in the Meramec River during the first week of May, but no losses of consequence were reported.

Missouri Valley.—Heavy rains over the upper and middle Floyd and Big Sioux River watersheds on the night of May 25-26 resulted in flooding in these basins. The losses in the Floyd River amounted to about \$44,000 and in the Big Sioux River, \$15,000.

The following item of interest, concerning the low stage in the Missouri River at Sioux City, Iowa, during May has been furnished by the official in charge at that station:

From May 14 to 26, inclusive, the Missouri River was at the lowest stage of record for the month of May at the Sioux City station. 4.6 feet on May 26, 1931, was the previous low stage. On May 24, 1937, the gage reading was 3.6 feet, or 1.0 foot under

the previous low reading for May. The record begins with 1879, and it is continuous for a period of 59 years.

The average stage for May 1937 at Sioux City was 4.6 feet, or 3.7 feet below the 59-year average. This was one-half foot lower than the average stage in 1889 and 1931, the previous low.

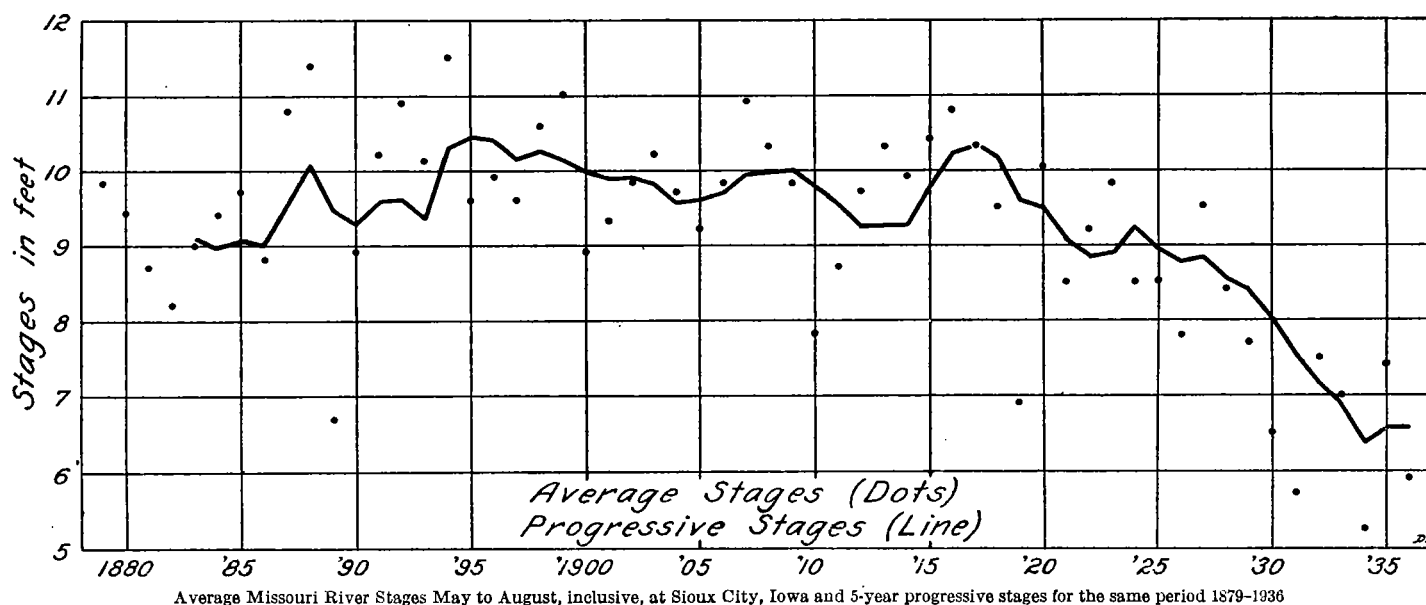
The accompanying graph, also prepared at Sioux City, Iowa, shows the marked decline of the summer stages in the Missouri River at Sioux City during the last 17 years. These changing conditions are well illustrated by the low level of the water table in recent years in the middle Missouri Valley.

Ohio and lower Mississippi Valleys.—Heavy rains during the first four days of May caused moderate floods in the lower White and the middle and lower Wabash Rivers. The damage was mostly to prospective crops and amounted to about \$14,000.

Light floods occurred in the lower Cumberland and in the Green River in Kentucky, but no losses of consequence were incurred.

The crest of the April flood in the upper Ohio River flattened out as it progressed downstream and did not exceed flood stage after passing Point Pleasant, W. Va. However, a weak low-pressure area appeared over the lower Mississippi Valley on the first of May and moved slowly northward to southeastern Missouri, where it remained almost stationary until the 5th before it finally moved eastward. This condition caused frequent and widespread rains over the central Mississippi and lower Ohio River Basins. These rains augmented the rise in the Ohio River so that shortly before the rise reached Evansville, Ind., flood stage was again exceeded and the flooding continued downstream to the mouth of the Ohio and on the lower Mississippi to Helena, Ark. Moderate flooding also occurred in the White and St. Francis Rivers in Missouri and Arkansas. The principal damage was to prospective crops. The total losses reported were as follows: Ohio River, \$70,000; Mississippi River, \$172,000; and White River, \$82,400.

A local flood occurred on the Ninnescah River, a tributary of the Arkansas River, near Cheney, Kans., as the result of excessive rains on the 26th. A total loss of about \$30,000 was reported. The North Canadian and South Canadian Rivers, also tributaries of the Arkansas, were



slightly above flood stage at the close of the month. No damage was reported.

West Gulf Drainage.—No flooding of consequence occurred during the month except that exceptionally heavy rains in portions of eastern New Mexico the latter part of May caused unprecedented high stages in the Pecos River. Heavy rains again occurred during the first part of June causing additional rises. A report on this flood will be made in the June issue of the Review.

Colorado River Basin.—A light flood occurred in the Gunnison River in Colorado with no material damage.

San Joaquin River Basin.—The inundated area in this basin increased steadily during the month as the result of melting of the heavy accumulation of snow in the Sierra Nevada foothills. The following report on the conditions in the upper portion of the basin is submitted by the Official in Charge at Fresno, Calif.

Kings River passed above the flood stage on May 12 and remained above that stage to and including May 18. It was again above flood stage on May 21 and 22 and May 28 to 30, inclusive.

These stages were fully anticipated in earlier forecasts of water supply and all protective measures possible had been under way for several weeks. Levees in the Tulare Lake Basin were strengthened but were not sufficient to hold the large run-off into this natural wasteway where attempts have been made to reclaim it and where in seasons of moderate mountain precipitation valuable grain and other crops have been harvested.

The inundated area has steadily increased during the month submerging cotton, beet and grain crops, the latter about ready to harvest. Harvesters are now in the area endeavoring to salvage as much of the crop as possible before rising waters cover it. Maximum diversions for irrigation are being made but a large portion of each day's run-off is reaching the basin and will continue to do so for several weeks more. The history of the summer stages of the stream is that in wet seasons maximum stages occur in June and it is expected that the maximum run-off of 19,000 second-feet on May 15, 1937, may be exceeded, if an unusually warm spell occurs.

The value of prospective crops already lost exceeds \$1,000,000 and much additional acreage is in danger.

The Sacramento, Calif., office reports as follows on the high water in the lower San Joaquin River Basin:

The San Joaquin River rose to moderately high stages during the month as a result of the melting of snow over the headwaters of its eastern tributaries. The highest stage reported from Lathrop, Calif., was 13.8 feet on the 28th, or 3.2 feet below the flood stage.

On May 18 local breaks occurred in the levees on the Stanislaus and San Joaquin Rivers near their junction, causing the flooding of about 3,000 acres of farm lands that had been planted to grain, beans, corn, tomatoes, and other crops.

The break on the Stanislaus River was on the south side near its mouth where similar levee failures have occurred during the past

2 or 3 years. Water from this source rapidly spread over about 1,500 acres in the lowest areas of the river junction farms. Adjoining on the south of this tract, but separated by a strip of higher ground, about an equal acreage of low land was inundated on the McMullen tract from a break on the east side of the San Joaquin River. A total of about 30 farm families were compelled to vacate their homes temporarily.

This season's crops in the flooded district will be almost a total loss as further melting of snow will maintain moderately high water levels until midsummer.

The total losses in the lower San Joaquin Basin amounted to about \$200,000—of this loss all but about \$20,000 resulted from the damage to prospective crops.

Correction for April Monthly Weather Review page 164, Table of Flood Stages:

Crest at Hancock, Md., published as "35.8" feet should be "35.7" feet.

Table of flood stages during May 1937

[All dates in May unless otherwise specified]

| River and station | Flood stage | Above flood stages—dates | | Crest | |
|---------------------------------|-------------|--------------------------|-----|------------------|-------|
| | | From— | To— | Stage | Date |
| ATLANTIC SLOPE DRAINAGE | | | | | |
| Connecticut: | <i>Feet</i> | | | <i>Feet</i> | |
| South Newbury, Vt..... | 18 | { Apr. 29 | 4 | 20.7 | 1 |
| | | 8 | 9 | 18.4 | 9 |
| | | 15 | 18 | 23.5 | 16 |
| | | 21 | 22 | 19.2 | 21 |
| White River Junction, Vt..... | 18 | 15 | 16 | 20.4 | 15 |
| Montague City, Mass..... | 28 | 15 | 17 | 31.4 | 16 |
| Holyoke, Mass..... | 9 | 16 | 17 | 9.6 | 16 |
| Hartford, Conn..... | 16 | 15 | 20 | 21.1 | 17 |
| James: Columbia, Va..... | 10 | (¹) | 1 | (²) | ----- |
| Roanoke: Williamston, N. C..... | 10 | Apr. 29 | 10 | 13.0 | 2, 3 |
| Tar: | | | | | |
| Tarboro, N. C..... | 18 | Apr. 28 | 4 | 22.7 | 1, 2 |
| Greenville, N. C..... | 13 | Apr. 28 | 6 | 16.9 | 3 |
| Neuse: | | | | | |
| Neuse, N. C..... | 14 | (¹) | 1 | (²) | ----- |
| Smithfield, N. C..... | 13 | (¹) | 2 | (²) | ----- |
| Goldsboro, N. C..... | 14 | Apr. 27 | 7 | 18.4 | 3 |
| Kinston, N. C..... | 14 | Apr. 29 | 9 | 16.3 | 6 |
| Peedee: | | | | | |
| Mars Bluff Bridge, S. C..... | 17 | Apr. 27 | 5 | 20.1 | 1 |
| Poston, S. C..... | 18 | (¹) | 8 | 19.9 | 3, 4 |
| Santee: | | | | | |
| | | (¹) | 10 | (²) | ----- |
| Rimini, S. C..... | 12 | { 12 | 17 | 12.9 | 16 |
| | | 19 | 23 | 12.5 | 21 |
| | | 27 | 30 | 12.4 | 29 |
| Ferguson, S. C..... | 12 | (¹) | 24 | 13.9 | 1, 2 |
| Savannah: | | | | | |
| Ellenton, S. C..... | 14 | { Apr. 25 | 11 | 21.3 | 3 |
| | | 15 | 19 | 17.0 | 17 |
| Clyo, Ga..... | 13 | 3 | 14 | 17.0 | 7, 8 |
| Ogeechee: | | | | | |
| Midville, Ga..... | 6 | 2 | 5 | 7.7 | 3 |
| Dover, Ga..... | 7 | 4 | 11 | 9.8 | 8 |

See footnotes at end of table.

Table of flood stages during May 1937—Continued
[All dates in May unless otherwise specified]

| River and station | Flood stage | Above flood stages—dates | | Crest | |
|--|-------------|--------------------------|-----|-------|---------|
| | | From— | To— | Stage | Date |
| ATLANTIC SLOPE DRAINAGE—continued | | | | | |
| Ocmulgee: | Feet | | | Feet | |
| Macon, Ga..... | 18 | Apr. 30 | 2 | 21.0 | Apr. 30 |
| Abbeville, Ga..... | 11 | 4 | 11 | 14.7 | 7 |
| Oconee: Milledgeville, Ga..... | 22 | Apr. 30 | 2 | 28.7 | Apr. 30 |
| Altamaha: | | | | | |
| Charlotte, Ga..... | 12 | 3 | 16 | 17.9 | 10, 11 |
| Everett City, Ga..... | 10 | 11 | 19 | 11.1 | 15 |
| EAST GULF OF MEXICO DRAINAGE | | | | | |
| Apalachicola: Blountstown, Fla..... | 15 | (1) | 16 | 20.2 | 5, 6 |
| Oostanaula: Rome, Ga..... | 25 | 1 | 1 | 25.5 | 1 |
| Coosa: | | | | | |
| Mayos Bar Lock, Ga..... | 28 | 1 | 1 | 28.8 | 1 |
| Gadsden, Ala..... | 20 | Apr. 30 | 9 | 24.5 | 5, 6 |
| Lock No. 4, Lincoln, Ala..... | 17 | Apr. 30 | 8 | 20.0 | 6 |
| Cahaba: Centerville, Ala..... | 23 | 1 | 1 | 23.8 | 1 |
| Alabama: | | | | | |
| Montgomery, Ala..... | 35 | 2 | 9 | 38.8 | 7 |
| Millers Ferry, Ala..... | 40 | 8 | 13 | 46.2 | 9 |
| Black Warrior: Lock No. 10, Tuscaloosa, Ala..... | 46 | 1 | 7 | 55.0 | 1 |
| Tombigbee: | | | | | |
| Gainesville, Ala..... | 36 | 6 | 13 | 41.0 | 10 |
| Lock No. 4, Demopolis, Ala..... | 39 | 3 | 17 | 53.3 | 11, 12 |
| Lock No. 3..... | 33 | 2 | 19 | 53.9 | 13 |
| Lock No. 2..... | 46 | 5 | 18 | 54.6 | 14 |
| Lock No. 1..... | 31 | 4 | 21 | 37.0 | 16, 17 |
| Pearl: | | | | | |
| Edinburg, Miss..... | 20 | 7 | 7 | 20.1 | 7 |
| Jackson, Miss..... | 18 | 5 | 16 | 22.1 | 13 |
| Pearl River, La..... | 12 | 5 | 9 | 12.7 | 7 |
| MISSISSIPPI SYSTEM | | | | | |
| Upper Mississippi Basin | | | | | |
| Illinois: | | | | | |
| Peru, Ill..... | 17 | Apr. 23 | 9 | 18.3 | 5 |
| Peoria, Ill..... | 18 | Apr. 27 | 12 | 19.6 | 6 |
| Havana, Ill..... | 21 | Apr. 21 | 21 | 16.5 | 6-9 |
| Beardstown, Ill..... | 14 | Apr. 27 | 22 | 17.3 | 9-11 |
| Bourbeuse: Union, Mo..... | 12 | 4 | 5 | 14.8 | 5 |
| Meramec: | | | | | |
| Sullivan, Mo..... | 11 | 1 | 5 | 15.7 | 4 |
| Valley Park, Mo..... | 14 | 2 | 7 | 21.2 | 6 |
| Missouri Basin | | | | | |
| Big Sioux: Akron, Iowa..... | 12 | 25 | 26 | 13.1 | 26 |
| Floyd: | | | | | |
| Merrill, Iowa..... | 13.5 | 25 | 26 | 13.8 | 25 |
| James, Iowa..... | 15 | 26 | 26 | 16.9 | 27 |
| Ohio Basin | | | | | |
| Green: | | | | | |
| Lock No. 4, Woodbury, Ky..... | 33 | 6 | 8 | 33.9 | 7 |
| Lock No. 2, Rumsey, Ky..... | 34 | 4 | 12 | 38.2 | 9 |
| West Fork of White: | | | | | |
| Anderson, Ind..... | 8 | (1) | 24 | (2) | 28 |
| Elliston, Ind..... | 18 | 3 | 6 | 19.7 | 5 |
| Edwardsport, Ind..... | 12 | Apr. 29 | 10 | 18.0 | 6 |
| White: | | | | | |
| Petersburg, Ind..... | 16 | 3 | 11 | 20.7 | 7 |
| Hazleton, Ind..... | 16 | 2 | 12 | 21.2 | 8 |

Table of flood stages during May 1937—Continued
[All dates in May unless otherwise specified]

| River and station | Flood stage | Above flood stages—dates | | Crest | |
|---|-------------|--------------------------|--------|----------|------------|
| | | From— | To— | Stage | Date |
| MISSISSIPPI SYSTEM—continued | | | | | |
| Ohio Basin—Continued | | | | | |
| Wabash: | Feet | | | Feet | |
| La Fayette, Ind..... | 11 | { (1) 6 | 1 | (2) 11.4 | 6 |
| Covington, Ind..... | 16 | { (1) 6 | 2 | (2) 15.9 | 3 |
| Terre Haute, Ind..... | 14 | Apr. 24 2 | 9 | 16.1 | 5, 6 |
| Vincennes, Ind..... | 14 | 2 | 11 | 20.8 | 8 |
| Mt. Carmel, Ill..... | 19 | 4 | 12 | 16.3 | 9, 10 |
| New Harmony, Ind..... | 15 | 5 | 9 | 52.6 | 8 |
| Cumberland: Lock F., Eddyville, Ky..... | 50 | 4 | | | |
| Ohio: | | | | | |
| Dam No. 25, near Addison, Ohio..... | 43 | { (1) 1 | 1 | (2) 41.2 | 5, 6 |
| Point Pleasant, W. Va..... | 40 | { (1) 1 | 1 | (2) 38.8 | 6 |
| Dam No. 47, Newburgh, Ind..... | 38 | 3 | 9 | 40.2 | 6, 7 |
| Evansville, Ind..... | 35 | 3 | 9 | 39.8 | 8 |
| Dam No. 48, near Henderson, Ky..... | 38 | 4 | 9 | 42.4 | 8, 9 |
| Dam No. 49, near Uniontown, Ky..... | 37 | 5 | 11 | 41.1 | 9 |
| Dam No. 50, Fords Ferry, Ky..... | 34 | 3 | 14 | 44.1 | 9 |
| Dam No. 51, Golconda, Ill..... | 40 | 7 | 11 | 50.0 | 10 |
| Dam No. 52, Brookport, Ill..... | 37 | 3 | 14 | 48.7 | |
| Dam No. 53, near Mound City, Ill..... | 42 | 3 | 15 | | |
| Cairo, Ill..... | 40 | 3 | 16 | | |
| White Basin | | | | | |
| Black: | | | | | |
| Poplar Bluff, Mo..... | 14 | { 2 | 2 | 14.0 | 2 |
| Black Rock, Ark..... | 14 | { 4 | 5 | 14.5 | 4 |
| White: | | | | | |
| Calico Rock, Ark..... | 18 | 2 | 3 | 21.8 | 2, 3 |
| Batesville, Ark..... | 23 | 3 | 4 | 26.6 | 3 |
| Georgetown, Ark..... | 21 | 7 | 16 | 22.2 | 11 |
| Clarendon, Ark..... | 26 | 13 | 23 | 26.7 | 17-19 |
| Arkansas Basin | | | | | |
| North Canadian: | | | | | |
| Woodward, Okla..... | 5 | 31 | June 1 | 5.0 | 31, June 1 |
| Canton, Okla..... | 6 | 30 | 30 | 6.0 | 30 |
| Yukon, Okla..... | 8 | 31 | 31 | 9.2 | 31 |
| Canadian: | | | | | |
| Camargo, Okla..... | 9 | 30 | 30 | 10.6 | 30 |
| Union City, Okla..... | 7 | 30 | 31 | 13.8 | 31 |
| Petit Jean: Danville, Ark..... | 20 | 3 | 4 | 21.4 | 8 |
| Lower Mississippi Basin | | | | | |
| Big Lake Outlet: Manila, Ark..... | 10 | 4 | 18 | 12.5 | 9, 10 |
| St. Francis: | | | | | |
| Fisk, Mo..... | 20 | 1 | 9 | 23.3 | 5, 6 |
| St. Francis, Ark..... | 18 | 5 | 16 | 21.0 | 9 |
| Mississippi: | | | | | |
| New Madrid, Mo..... | 34 | 6 | 15 | 37.9 | 10, 11 |
| Memphis, Tenn..... | 34 | 13 | 17 | 34.8 | 15 |
| Helena, Ark..... | 44 | 14 | 20 | 45.2 | 17, 18 |
| WEST GULF OF MEXICO DRAINAGE | | | | | |
| Rio Grande: | | | | | |
| Espanola, N. Mex..... | 7 | { (1) 15 | (2) 15 | 8.3 | 11, 13-16 |
| Albuquerque, N. Mex..... | 4 | { 24 | 25 | 4.0 | 15 |
| GULF OF CALIFORNIA DRAINAGE | | | | | |
| North Fork of Gunnison: Paonia, Colo..... | 9 | { 10 | 11 | 9.0 | 10, 11 |
| Gunnison: Delta, Colo..... | 9 | { 6 | 6 | 9.0 | 6 |
| | | { 8 | 20 | 10.8 | 16 |

¹ Continued from previous month.

² Crest occurred during previous month.

³ Fell 1.2 feet below flood stage on 2d.

⁴ Fell slightly below flood stage on 18th, 21st, and 23d.

⁵ Continued into June.

WEATHER ON THE ATLANTIC AND PACIFIC OCEANS

[The Marine Division, I. R. TANNEHILL, in charge]

NORTH ATLANTIC OCEAN, MAY 1937

By H. C. HUNTER

Atmospheric pressure.—The pressure averaged higher than normal over most eastern and south-central portions, Lerwick in the Shetland Islands showing an excess for the month of 0.19 inch. The waters near Canada and Newfoundland likewise had pressure higher than normal. A moderate deficiency was noted over the southwestern part of the North Atlantic and a somewhat greater one near Greenland and Iceland; Reykjavik, in the latter island,

had 0.18 deficiency. Over this far-northern area the pressure averaged considerably lower during the first half of the month than during the second half.

The extremes of pressure among vessel reports at hand are 30.70 and 29.25 inches. The higher mark was noted on the British steamship *Matina* on the morning of the 18th, about 200 miles northwest of Horta. The lower reading was made on the Danish steamship *Tennessee*, on the following day, near latitude 57° N., longitude 21° W. However, the pressure on the 7th at Julianehaab, Greenland, was much lower, as indicated in table 1.